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Subject: Microbiology Data Validation (Dimock – Week 1, Sample Batch 1)

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Overview

Sample Batch 1 consists of 20 samples (including some field blanks) that were analyzed by Northeastern Environmental Laboratories, Inc., Scranton, PA, for the following parameters:

Parameter	Analytical Method
Total Coliforms (TC)	SM 9222B
Fecal Coliforms (FC)	SM 9222B + SM 9221E
Heterotrophic Bacteria Count (HPC)	SM 9215C

Data quality was reviewed based on the criteria set forth in *Standard Methods for the Examination of Water and Wastewater*, 20th Edition, and the *USEPA Manual for the Certification of Laboratories Analyzing Drinking Water*, 5th Edition, *Chapter 5 – Critical Elements for Microbiology*. Data quality problems are listed below.

Summary

The are several data quality issues associated with Week1/Batch1 microbiology data. The total coliform and fecal coliform results for nine of the samples contain no problems at all. The results for 10 samples may be biased high although the detections are acceptable. The TC/FC data for one sample must be rejected. HPC data for 17 samples must be rejected; the values for the remaining three HPC samples are estimated and possibly biased low. Data qualifications are provided in Table 1 under Conclusions.

Data Quality Issues

1. TC/FC and HPC Transport Temperatures: For total coliforms, fecal coliforms, and HPC, the cooler transport temperature was in compliance with the <10°C requirement for 10 of the 20 samples, but for the other 10 (highlighted in gray below), cooler temperature was not recorded on the COC. Without documentation of the required temperature, it must be assumed samples were not adequately cooled during transport. Any quantitative results from the highlighted samples may therefore be biased high.

FB01	HW01	HW06	HW17
FB02	HW02	HW08a	HW19
FB03	HW02z	HW12	HW19-P
FB04	HW04	HW14	HW24
FB05	HW05	HW14-P	HW24-P

2. TC/FC and HPC Field Blanks: All field blanks produced negative results (< 1 CFU) except for FB02 which produced a positive HPC result (3 CFU/mL). FBO2 accompanied the collection of only one sample, HW04. Any positive results for HW04 could be the result of field contamination.

FB01	HW01	HW06	HW17
FB02	HW02	HW08a	HW19
FB03	HW02z	HW12	HW19-P
FB04	HW04	HW14	HW24
FB05	HW05	HW14-P	HW24-P

3. HPC Holding Times: Although the 30-hour holding time for total and fecal coliforms was met for all samples, the 8-hour holding time for HPC was exceeded for 17 of the 20 samples. For those 17 (listed below), holding times ranged from 9 to 23 hours (average = 18.9 hours). Depending on other water quality factors an extended holding time may cause the number of bacteria present to increase, decrease, or remain unchanged. Results therefore may be biased high, low, or not affected.

FB01	HW01	HW06	HW17
FB02	HW02	HW08a	HW19
FB03	HW02z	HW12	HW19-P
FB04	HW04	HW14	HW24
FB05	HW05	HW14-P	HW24-P

4. HPC Duplicate Plates: Duplicate HPC plates, as required by the method, were used for the analysis of all but the four samples highlighted in gray below. For those samples analyzed using duplicate plates, the number of CFU/mL reported is an average of the two plates and as such would be more accurate. The analyses done without duplicate plates (i.e., done with single plates only) are less accurate and are highlighted below.

FB01	HW01	HW06	HW17
FB02	HW02	HW08a	HW19
FB03	HW02z	HW12	HW19-P
FB04	HW04	HW14	HW24
FB05	HW05	HW14-P	HW24-P

5. HPC Method Blanks: A method blank (or R2A agar sterility control plate) is needed for each series of plates poured. One such control ("Blank R2A") was used with a series of three samples on 1/24/12 and generated a negative result (<1CFU/mL) , but for all other series of HPC samples (highlighted below in gray), there is no record of a method blank with the raw data. Consequently, without a clean method blank showing no growth, the HPC results obtained could be due to agar contamination or contamination of a sample during analysis.

FB01	HW01	HW06	HW17
FB02	HW02	HW08a	HW19
FB03	HW02z	HW12	HW19-P
FB04	HW04	HW14	HW24
FB05	HW05	HW14-P	HW24-P

6. HPC Agar Positive Control: No agar positive control results were provided in QC data package. Lab confirmed that this QC was not performed. Results for all samples (highlighted below in gray) are affected and may be biased low, especially results indicating <1 CFU/ml.

FB01	HW01	HW06	HW17
FB02	HW02	HW08a	HW19
FB03	HW02z	HW12	HW19-P
FB04	HW04	HW14	HW24
FB05	HW05	HW14-P	HW24-P

Conclusions

Table 1. presents the final data qualifications for Week 1/Batch 1 where they apply. The number in parentheses corresponds to the data quality issue discussed above.

Table 1. Data Qualifiers

SAMPLE	QUALIFIERS for TC/FC DATA	QUALIFIERS for HPC DATA
FB01		J(3,4),L(6)
FB02		R(5)
FB03		R(5)
FB04	K(1)	R(5)
FB05	K(1)	R(5)
HW01		R(5)
HW02		R(5)
HW02z		R(5)
HW04	R(2,5)	R(2,5)
HW05	K(1)	R(5)
HW06	K(1)	R(5)
HW08a		R(5)
HW12	K(1)	R(5)
HW14	K(1)	R(5)
HW14-P	K(1)	R(5)
HW17	K(1)	R(5)
HW19		J(3,4), L(6)
HW19-P		J(3), L(6)
HW24	K(1)	R(5)
HW24-P	K(1)	R(5)